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**Regenerative growth in *Drosophila* imaginal discs is regulated by Wingless and Myc.**

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**Public Summary:**

**Scientific Abstract:**

The study of regeneration would be aided greatly by systems that support large-scale genetic screens. Here we describe a nonsurgical method for inducing tissue damage and regeneration in *Drosophila* larvae by inducing apoptosis in the wing imaginal disc in a spatially and temporally regulated manner. Tissue damage results in localized regenerative proliferation characterized by altered expression of patterning genes and growth regulators as well as a temporary loss of markers of cell fate commitment. Wingless and Myc are induced by tissue damage and are important for regenerative growth. Furthermore, ectopic Myc enhances regeneration when other growth drivers tested do not. As the animal matures, the ability to regenerate is lost and cannot be restored by activation of Wingless or Myc. This system is conducive to forward genetic screens, enabling an unbiased search for genes that regulate both the extent of and the capacity for regeneration.

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